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*The proximal and distal diameter of the human internal iliac artery
in different periods of life*

The internal iliac artery is the main artery of the lesser pelvis. It supplies viscera and wall of pelvis, external genital organs, perineum and posterior-superior part of thigh (1, 6). The vessel arises from the common iliac artery, on the level of the fifth lumbar vertebrae, medially from the sacroiliac joint (1, 6, 13, 16). Knowledge about the size of the internal iliac artery has a large clinical implications, especially in dynamically developing interventional radiology as well as in vascular surgery, oncology, gynecology and obstetrics (7, 8, 10–12).

The aim of the study was to evaluate the proximal (initial) and distal (final) diameter of the internal iliac artery in human in different periods of life.

MATERIAL AND METHODS

The study was conducted on 220 unfixed human bodies of both sexes, including 110 males and 110 females, aged 7 months of fetal life till 82 years (Table 1, 2). The number of individuals in all the examined groups depended on the material accessibility. The children groups were divided based on the psychosomatic development.

The proximal diameter of the internal iliac arteries was measured in place where the artery arises from the common iliac artery. The distal diameter was measured in place where the artery divided into anterior and posterior trunk or where the superior gluteal artery arises from the main trunk of vessel. All the measurements were done using the linear dimensions calliper with exactitude to 0.1 mm.

The data were statistically analyzed using Mann–Whitney U test. An $\alpha = 0.05$ ($p < 0.05$) was considered significant.

RESULTS

The absolute proximal and distal diameters of the external iliac arteries depended on age (Table 1, 2). The statistical differences were noted between all the examined age groups. Such results were observed independently of sex or body side. The highest changes in both absolute and relative values were revealed in children aged 4–6 years and in adult group aged 30–39 years.

No statistically significant differences in distal/proximal ratio were found between the left and the right side both in males and females (Fig. 1).

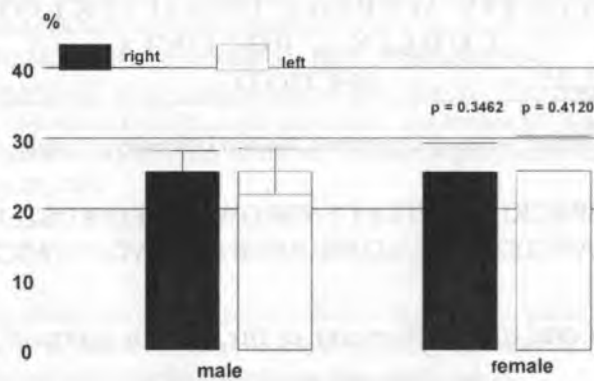


Fig. 1. Relation of distal/proximal ratio of the diameter of the internal iliac artery in males and females

Table 1. The proximal and distal diameter (mm) of the internal iliac artery in male

Age	n	Proximal diameter						Distal diameter					
		right			left			right			left		
		min.	max.	mean	min.	max.	mean	min.	max.	mean	min.	max.	mean
7 m.pr.l.	4	1.7	2.3	1.98	2.0	2.2	2.13	1.5	2.6	2.00	1.6	2.3	1.83
8 m.pr.l.	3	2.7	3.6	3.17	2.1	3.6	2.90	2.1	3.7	2.97	2.2	3.4	2.80
9 m.pr.l.	3	3.2	3.5	3.37	3.1	3.9	3.50	3.0	3.5	3.33	3.0	3.7	3.30
Newborn	10	2.6	4.2	3.13	2.5	4.1	3.18	2.0	3.9	3.04	2.1	4.2	2.92
1–3 m.p.l.	2	3.3	3.9	3.60	3.1	3.8	3.45	2.8	3.8	3.30	2.6	4.1	3.35
4–6 m.p.l.	5	3.0	3.9	3.52	2.8	4.1	3.42	3.1	4.3	3.58	3.3	4.4	3.68
7–11 m.p.l.	3	3.0	4.0	3.43	3.8	4.7	4.23	2.5	4.5	3.40	3.7	4.1	3.93
1–3 years	4	2.9	4.8	3.75	3.0	4.2	3.59	2.7	4.1	3.33	2.9	4.4	3.45
4–6 years	3	3.9	4.6	4.23	3.6	4.8	4.30	3.5	4.5	4.10	3.7	4.3	4.00
7–9 years	3	4.7	5.5	5.17	4.0	5.2	4.73	4.0	5.2	4.67	3.6	5.6	4.70
10–12 years	2	4.5	5.6	5.05	4.0	6.0	5.00	4.1	5.2	4.65	4.7	5.4	5.05
13–16 years	3	5.9	6.7	6.33	5.2	5.8	5.43	5.7	6.3	5.97	4.5	5.7	5.37
17–19 years	5	5.8	6.9	6.24	5.6	6.8	6.16	5.6	6.8	6.12	5.5	7.2	6.20
20–29 years	10	5.6	7.6	6.63	6.4	7.5	6.95	5.4	7.9	6.57	6.0	7.7	6.79
30–39 years	10	6.4	8.8	8.07	6.8	8.5	7.74	6.9	8.7	7.63	6.5	9.1	7.71
40–49 years	10	6.7	8.3	7.48	5.5	7.7	6.81	5.7	7.8	7.20	5.3	8.1	6.69
50–59 years	10	7.7	10.7	8.64	8.5	10.3	9.33	7.1	10.2	8.52	8.0	10.0	9.05
60–69 years	10	7.5	9.8	8.72	7.7	9.7	8.46	6.7	10.0	8.65	7.2	8.9	8.26
≥70 years	10	7.4	10.3	9.26	7.9	10.6	8.82	6.8	9.9	9.05	7.1	9.6	8.49

m.pr.l – months of prenatal life; m.p.l. – months of postnatal life

Table 2. The proximal and distal diameter (mm) of the internal iliac artery in female

Age	n	Proximal diameter						Distal diameter					
		right			left			right			left		
		min.	max.	mean	min.	max.	mean	min.	max.	mean	min.	max.	mean
7 m.pr.l.	2	1.7	2.3	2.00	1.6	2.4	2.00	1.4	2.3	1.85	1.5	2.4	1.95
8 m.pr.l.	6	2.0	2.9	2.50	1.8	3.2	2.55	1.7	3.1	2.48	1.3	3.5	2.37
9 m.pr.l.	2	2.6	3.4	3.00	2.0	3.7	2.85	2.5	3.3	2.90	2.6	3.3	2.95
Newborn	10	2.3	4.1	3.42	2.5	4.3	3.28	2.0	3.9	3.31	2.1	4.4	3.03
1–3 m.p.l.	4	2.5	3.8	3.08	2.9	3.4	3.15	2.3	3.3	2.73	2.7	4.0	3.13
4–6 m.p.l.	3	3.6	4.1	3.87	2.7	4.4	3.60	3.4	3.8	3.60	3.3	3.9	3.67
7–11 m.p.l.	3	3.3	4.2	3.70	3.5	4.2	3.87	2.9	3.9	3.33	3.2	4.0	3.50
1–3 years	6	3.0	4.9	3.55	2.4	4.7	3.78	2.5	4.4	3.37	2.7	4.3	3.73
4–6 years	2	3.9	5.7	4.80	4.2	5.9	5.05	4.7	5.0	4.85	3.8	5.5	4.65
7–9 years	2	4.7	5.5	5.10	4.5	5.3	4.90	4.4	5.1	4.75	4.1	5.4	4.75
10–12 years	3	4.1	5.7	4.77	4.8	5.6	5.30	3.9	5.4	4.63	4.3	5.1	4.77
13–16 years	1	5.6			5.2			5.5			5.6		
17–19 years	6	5.2	6.8	6.25	4.5	6.9	5.85	4.9	6.8	6.08	5.1	6.3	5.53
20–29 years	10	4.9	7.2	6.16	4.7	6.6	5.71	4.3	7.0	6.02	4.5	6.7	5.44
30–39 years	10	4.9	8.0	6.74	5.9	8.6	7.11	5.6	7.6	6.68	4.8	8.7	6.92
40–49 years	10	5.4	7.6	6.09	4.4	7.4	6.35	4.6	6.8	5.87	5.3	7.5	6.26
50–59 years	10	6.8	8.6	7.55	6.0	7.9	6.94	6.3	8.2	7.36	5.1	8.4	6.85
60–69 years	10	6.5	9.0	7.42	6.4	8.8	7.78	5.9	8.1	7.27	5.6	8.2	7.19
≥70 years	10	7.5	9.8	8.56	7.6	9.4	8.33	7.0	9.4	8.10	7.3	9.2	8.23

m.pr.l. – months of prenatal life; m.p.l. – months of postnatal life

DISCUSSION

The study showed dependence of dimensions of the internal iliac arteries on age in different developmental periods.

According to Adachi (1), the diameter of the internal iliac artery in adults was 5–8 mm, usually mean 6 mm. Bochenek (6) indicated 8–9 mm, while Luzsa (16) reported just 5 mm, with deviation between 3 and 7 mm. The authors stressed that there were no larger differences among diameters of arteries on the right and the left side of the body in adults. However, in fetuses, newborn and small children the right artery has usually wider diameter than the left one (1–9, 14–16), but none of the authors revealed sex differences.

It should be also noted that in adults the internal iliac artery is smaller than the external one. However, higher dimension of the internal iliac artery was observed in fetal period (2, 13). Such differences could explain the weaker development of the lower limbs (14–16).

In conclusion, it could be stressed that proximal and distal diameters of the internal iliac artery depend only on age but not on sex and the side of the body.

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SUMMARY

The aim of the study was to evaluate the proximal (initial) and distal (final) diameter of the internal iliac artery in human in different periods of life. The study was conducted on 220 unfixed human bodies of both sexes, aged 7 months of fetal life till 82 years. The proximal diameter of the internal iliac arteries was measured in place where the artery arises from the common iliac artery. The distal diameter was measured in place where artery divided into anterior and posterior trunk or where the superior gluteal artery arises from the main trunk of vessel. The absolute proximal and distal diameters of the external iliac arteries depended on age. The statistical differences were noted between all the examined age groups. Such results were observed independently of sex or body side. The highest changes in both absolute and relative values were revealed in children aged 4-6 years and in the adult group aged 30-39 years.

Średnica początkowa i końcowa tętnicy biodrowej wewnętrznej u ludzi w różnych okresach życia

Celem pracy była ocena średnicy początkowej i końcowej tętnicy biodrowej wewnętrznej u ludzi w różnych okresach życia. Badania przeprowadzono na 220 nieformalizowanych zwłokach ludzkich w wieku od 7 miesiąca życia płodowego do 82 roku życia. Średnicę początkową mierzono w miejscu odejścia naczynia od tętnicy biodrowej wspólnej, zaś końcową w miejscu podziału na pień przedni i tylny bądź na wysokości odejścia tętnicy pośladowej górnej. W badaniach wykazano, że wymiary bezpośrednie naczynia zależały od wieku osobniczego. Statystycznie istotne różnice obserwowano między poszczególnymi grupami wiekowymi, niezależnie do płci i strony ciała. Największe różnice zarówno w wymiarach bezpośrednich, jak i pośrednich obserwowano w grupie dzieci w wieku 4–6 lat oraz u osobników starszych w wieku 30–39 lat.